Name: _____ Date: _____ Per: _____

Worksheet AA4-4: Unit 4 Parabola Practice

1) Write the equation of a parabola with the following features.

Open up/down	Stretch factor	Vertex	Equation
a) Up	1	(2, -5)	$y = 1(x-2)^2 - 5$
b) Up	0.5	(0, 4)	$y = 0.5(x)^2 + 4$
c) Down	2	(-10, -7)	$y = 2(x+10)^2 - 7$
d) Down	5	(6, 0)	$y = 5(x-6)^2$
e) Up	0.75	(4, 8)	$y = 0.75(x-4)^2 + 8$

2) Analyze the features of the following parabolas by completing the table for each equation.

Equation	Open up/down	Stretch factor	Relative width (narrow/wide/ "normal")	Location of vertex
a) $f(x) = 2(x+4)^2 - 6$	Up	2	Narrow	(-4, -6)
b) $f(x) = 0.5x^2 + 5$	up	0.5	Wide	(0, 5)
c) $f(x) = -4(x-2)^2 - 10$	Down	-4	Narrow	(2, -10)
d) $f(x) = (x-1)^2$	Up	1	Normal	(1, 0)
e) $f(x) = -0.75(x+8)^2 + 3$	Down	-0.75	Wide	(-8, 3)

3) Find the equation of the parabola with the given vertex, passing thru the given point.

a) Vertex (-2, 3) point (0, 8)

$y = a(x+2)^2 + 3$

$8 = a(0+2)^2 + 3$

$8 = a(2)^2 + 3$

$-3 \quad -3$

$5 = 4a$

$5/4 = a$

$y = \frac{5}{4}(x+2)^2 + 3$

b) Vertex (4, -6) point (2, -7)

$y = a(x-4)^2 - 6$

$-7 = a(2-4)^2 - 6$

$-7 = a(-2)^2 - 6$

$+6 \quad -7 = 4a - 6 \quad +6$

$-1 = 4a$

$-1/4 = a$

$y = -\frac{1}{4}(x-4)^2 - 6$

c) Vertex (10, 40) point (4, 0)

$y = a(x-10)^2 + 40$

$0 = a(4-10)^2 + 40$

$0 = a(-6)^2 + 40$

$0 = 36a + 40$

$-40 = 36a$

$-\frac{40}{36} = a = -\frac{10}{9}$

$y = -\frac{10}{9}(x-10)^2 + 40$

d) Vertex (0, 50) point (75, 0)

$y = a(x-0)^2 + 50$

$0 = a(75-0)^2 + 50$

$0 = a(75)^2 + 50$

$0 = a \cdot 5625 + 50$

$-50 = a \cdot 5625$

$\frac{-50}{5625} = a = -\frac{2}{225}$

$y = -\frac{2}{225}x^2 + 50$

4) Find the vertex of each parabola and write the equation in vertex form.

a) $y = x^2 + 10x + 24$

$y = (x+5)^2 - 1$ V: $(-5, -1)$

x^2	$5x$	24
$5x$	25	−25

b) $y = x^2 - 4x - 12$

$y = (x-2)^2 - 16$

V: $(2, -16)$

x^2	$-2x$	−12
$-2x$	4	−4

c) $y = 2x^2 - 9x - 1$

$y = 2(x^2 - \frac{9}{2}x) - 1$

$y = 2((x - \frac{9}{4})^2 - \frac{81}{16}) - 1 = 2(x - \frac{9}{4})^2 - \frac{81}{8} - 1$

x^2	$-\frac{9}{4}x$	$-\frac{81}{16}$
$-\frac{9}{4}x$	$\frac{81}{16}$	

$y = 2(x - \frac{9}{4})^2 - \frac{89}{8}$

V: $(\frac{9}{4}, -\frac{89}{8})$

d) $y = (x+5)(x-3)$

$x^2 + 5x - 3x - 15$

$x^2 + 2x - 15$

$(x+1)^2 - 16$

x^2	$1x$	−15
$1x$	1	−1

V: $(-1, -16)$

e) $y = x^2 + 5x - 14$

x^2	$2.5x$	−14
$2.5x$	6.25	−6.25

$(x + 2.5)^2 - 20.25$

V: $(-2.5, -20.25)$

f) $y = 2(x+3)(x-9)$

$y = 2(x^2 + 3x - 9x - 27)$

$y = 2(x^2 - 6x - 27)$

$y = 2($

x^2	$-3x$	−27
$-3x$	9	−9

$)$

$y = 2((x-3)^2 - 36)$

$y = 2(x-3)^2 - 72$

V: $(3, -72)$